

Popov, S. Ya.

✓ [Kinetics of Electrode Processes. II.—] Influence of Thiourea on the Electrocrystallization of Nickel. L. I. Antropov and S. Ya. Popov (*Zhur. Priklad. Khim.*, 1954, 27, (2), 203-209). <sup>2</sup> [In Russian]. The influence of thiourea on the electrodeposition of Ni from heated baths based on the compn.:  $\text{NiSO}_4 \cdot 7\text{H}_2\text{O}$  200,  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$  80,  $\text{H}_3\text{BO}_3$  20,  $\text{NaCl}$  10 g./l., has been studied by the methods previously used for Cu baths (cf. A. and P., *ibid.*, (1), 55; *M.A.*, 23, 681). Addn. of 0.2-0.3 g./l. thiourea increased the cathode potential at c.d.  $> 0.5$  amp./dm.<sup>2</sup>, but at lower c.d. slight depolarization was observed. The limiting cathodic c.d. ( $\sim 8$  amp./dm.<sup>2</sup>) was unchanged by thiourea. At c.d.  $\sim 1$  amp./dm.<sup>2</sup> below the limit, addn. of thiourea led to the prodn. of bright Ni deposits of increased hardness (40% increase for 0.2 g./l. thiourea). The current efficiency was almost unaffected by thiourea, and was 95-98% at the cathode and  $\sim 100\%$  at the anode, except for c.d.  $< 1$  or  $> 7-8$  amp./dm.<sup>2</sup>; (under these conditions thiourea was not stable). Photomicrographs of deposits on Cu undercoat showed that thiourea reduced the grain size.  
—G. V. E. T.

SOV/110-58-11 -19/28

AUTHOR: Popov, S.Ya. (Cand.Tech.Sci.)

TITLE: An Ammonium Chloride Electrolyte for Zinc Plating  
(Khloristoammoniyevyy elektrolit dlya tsinkovaniya).

PERIODICAL: Vestnik Elektromyshlennosti, Nr.11, 1958, pp.63-65,  
(USSR)

ABSTRACT: Cyanide and alkali electrolytes that are commonly used for zinc plating parts of complicated shape have some disadvantages. It was decided to study electrolytes containing ammonia complex zinc compounds. Stable zinc complexes are formed when zinc oxide is dissolved in a concentrated solution of ammonium chloride and, therefore, the condition of cathodic deposition of zinc from this electrolyte was investigated. When this electrolyte is used, considerable cathode polarisation is observed; the reasons for this are discussed. With ammonium chloride concentration of 250 g/litre the variation of the zinc oxide content from 3 to 14 g/litre had no influence on the pH values of the solution, which remained at 6.85. The limiting current-density of

Card 1/2

An Ammonium Chloride Electrolyte for Zinc Plating.

SOV/110-58-11-19/28

deposition of zinc increases as the zinc concentration in the solution rises. The influence of a number of colloidal and surface active substances was studied. The addition of appropriate quantities of carpenters' glue, thio-urea and boric acid improved the structure of the zinc precipitated on the cathode. Practical tests were made in a plating shop and the analysis of the electrolyte used is given. The method of preparing the bath is described. The test results are reviewed and are considered to be generally satisfactory. The speed of deposition is somewhat greater than with cyanide for a given current density, and the quality is satisfactory. The new electrolyte is recommended for use in place of cyanide baths.

SUBMITTED: May 27, 1957.

1. Zinc--Plating results
2. Electrolytes--Properties
3. Electrolytes--Test
4. Ammonium chloride--Performance

Card 2/2

POPOV S YA.

PHASE I BOOK EXPLOITATION SOV/2216

5(4)

Sovetskaniye po elektrokimii. 4th, Moscow, 1956.

Trudy... i [labornik] (Transactions of the Fourth Conference on Electrochemistry: Collection of Articles) Moscow: Izd-vo AN SSSR, 1959. 888 p. Errata slip inserted. 2,500 copies printed. Sponsoring Agency: Akademiya nauk SSSR. Otdeleniye khimicheskikh nauk.

Editorial Board: A.N. Frumkin (Resp. Ed.) Academician, O.A. Yessin, Professor, S.I. Zhidomirov (Resp. Secretary), B.N. Kabanov, Professor, S.I. Zhidomirov (Resp. Secretary), B.N. Kabanov, Professor, Ya. M. Kolopriyazhnikov (Resp. Secretary), V.V. Losev, P.D. Lukatskiy, Professor, Z.A. Solov'yeva, V.V. Stender, Professor, and G.M. Florianskiy; Ed. of Publishing House: N.G. Yagorov; Tech. Ed.: T.A. Prusakova.

PURPOSE: This book is intended for chemical and electrical engineers, physicists, metallurgists and researchers interested in electrochemistry. COVERAGE: The book contains 127 of the 136 reports presented at the Fourth Conference on Electrochemistry sponsored by the Department of Chemical Sciences and the Institute of Physical Chemistry, Academy of Sciences, USSR. The collection pertains to different branches of electrochemical kinetics, electrostatics, electrocatalysis, galvanic processes in metal-ion systems, corrosion and industrial electropolymerization. Abridged editions of the reports are given at the end of each division. The majority of the reports are not included here have been published in periodical literature. No personalities are mentioned. References are given at the end of most of the articles.

Shao, O.A., K.I. Urubkova, V.A. Kurnetsova, and A. Ya. Zerkhunov. Production of High-Purity Zinc by the Method of Electrolytic Purification 558

Popov, S. Ya. Galvanic Films From Complex Ammonia and Ammonium Electrolytes 561

Discussion [Yu. V. Lyzlov, B.S. Krasikov, B. Ya. Karnachev, G.E. Panchuk, M.V. Gudim, A.M. Ozerov and contributing authors] 564

PART VI. PASSIVITY OF METALS AND CHEMICAL ADSORPTION LAYERS 577

Bonkheffer, K.P. (Deceased) (Germany). Activation of Passive Iron 579

Kolotyrkin, Ya. M., V. M. Knyazhnyy, and N. Ya. Bune (Physicochemical Institute imeni L. I. Korshak). Acidic Passivation of Metals in Aqueous Solutions of Electrolytes 594

Card 23/34

30V/137-59-12-26360

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 12, p 89 (USSR)

AUTHORS: Bondarenko, A.V., Popov, S.Ya.

TITLE: The Effect of Ultrasonic Waves on Electrocrystallization of Metals

PERIODICAL: Byul. tekhn.-ekon. inform. Sovnarkhoz Rostovsk. ekon-adm. r-na, 1959, Nr 1, pp 47 - 49

ABSTRACT: Besides the testing of equipment and the development of experimental methods, the basic problem of the investigation was to reveal the possible effect of ultrasonic waves on the formation of crystallization centers, on the contact exchange, and increase in the current density. The authors investigated the deposition of Cu on the Cu-cathode, of Pb on the Pb-cathode, of Ag on Cu and deposition of Zn. It was stated that the ultrasonic waves increased the current density in deposition from non-cyanide electrolytes; that a primary thin metal layer, well adhesive to the base, was formed which subsequently was extending beyond the ultrasonic field.

Card 1/1

T.K.

5 (1,2,3)

AUTHORS:

Chechel', P. S., Popov, S. Ya.

SOV/153-2-1-14/25

TITLE:

Polarographic Determination of Joiner's Glue and Soap Root in Zinc Electrolytes (Polyarograficheskoye opredeleniye stolyarnogo kleya i myl'nogo kornya v tsinkovykh elektrolitakh)

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 1, pp 67 - 72 (USSR)

ABSTRACT:

The determination of Joiner's glue in electrolytes is usually neglected since the analysis is complicated and tiresome. Joiner's glue is known to be added to many electrolytes used in galvanic technology and hydroelectrometallurgy. The glue content is usually evaluated according to the quality of cathodic deposition. Such an approximate method is obviously unsatisfactory in many cases. In addition to that, soap root (*Saponaria officinalis*) is contained in the zinc electrolytes used in hydroelectricmetallurgy. It improves the formation of foam on the surface of the electrolyte during the electrolysis. As a result, the air in the electrolysis works department is less contaminated by acid vapors. Nevertheless, the ratio of soap root to Joiner's glue in the electrolytes is of some importance since soap root af-

Card 1/4

Polarographic Determination of Joiner's Glue and Soap  
Root in Zinc Electrolytes

30V/153-2-1-14/25

fects also the cathodic separation of zinc. The usual methods of separate determination of the glue and the root have not yet been described up to now. In the present article the authors attempted to develop a rapid and sufficiently accurate method of determining (a) Joiner's glue in the chlorine-ammonium-zinc electrolyte (according to reference 1); (b) of the glue and root when commonly present in sulphate-zinc electrolytes which are employed in the hydroelectrometallurgy of zinc (Ref 2). Table 1 shows the composition of these electrolytes. In view of the surface-active properties of the two above-mentioned substances (Refs 3-8) the authors further employed the method of reducing the maxima of the polarographic amplitudes. Figure 1 shows this maxima reduction on zinc polarograms with increasing glue content. Figure 2 contains a calibration curve for determining bone glue in ammonium-zinc electrolytes. Figures 3 and 4 demonstrate the polarographic maxima of zinc in the presence of various concentrations of Joiner's glue and soap root. Figures 5 and 6 show the dependence of the concentration of glue and root on the logarithm of the maximum on zinc polarograms at various concentrations of soap root and Joiner's glue. Figures 7 and 8 contain ca-

Card 2/4

Polarographic Determination of Joiner's Glue and Soap Root in Zinc Electrolytes SOV/153-2-1-14/25

libration curves for soap root and bone glue. Results of the determination of the glue content in various electrolytes are given in table 2. Similar results were obtained with soap root. The course of analysis is then described. C o n c l u s i o n s : (1) The capability of Joiner's glue and soap root of reducing polarographic maxima can be employed for the purpose of determining their concentration in zinc electrolytes with satisfactory accuracy for practical purposes. (2) Joiner's glue reduces these maxima more intensely than soap root. The variation of the maximum level by the concentration of one of these substances is independent of the content of the other one. Therefore they can be separately determined if both of them are present in the sulphate-zinc electrolyte. The method of determination devised for the afore-mentioned purpose may be employed also in other cases where simultaneous determination of two surface-active substances is necessary. There are 8 figures, 2 tables, and 8 references, 7 of which are Soviet.

Card 3/4

KUDRYAVTSEVA, I.D.; MINKINA, I.N.; SEMCHENKO, V.D.; POPOV, S.Ya.;  
SMIRNOV, V.A.

Electrolytic iron plating in ammonium chloride electrolytes.  
Trudy NPI 146:55-59 '64. (MIRA 18:11)

GRIGOR'YEV, V.P.; POPOV, S.Ya.

Effect of the acidity of the solution and of the conditions of adsorption of surface-active agents on the kinetics of copper contact displacement by iron. Trudy NPI 133:37-52 '62.

Effect of the conditions of cathodic polarization on the protective properties of lime deposits. Ibid.:79-93 (MIRA 17:2)

POPOV, S.Ya.

Study of the cathodic polarization of metal deposition by the analysis of differential polarograms. Trudy NPI 133:21-36 '62.  
(MIRA 17:2)

BONDARENKO, A.V.; POPOV, S.Ya.

Effect of acoustic vibrations on the passivation of a cathode surface during electrocrystallization of zinc. Trudy NPI 133:53-58  
'62. (MIRA 17:2)

GRIGOR'YEV, V.P.; POPOV, S.Ya.; NOSOV, I.M.

Industrial adoption of the technology of direct copper plating of  
iron parts in a sulfate ammonium electrolyte. Trudy NPI 134:59-63  
'62. (MIRA 17:2)

POPOV, S.Ya.; RYBYANETS, K.A.; GOLOSNITSKAYA, V.A.

Cathodic polarization in the isolation of Zn, Cd, Ag, and Cu from complex ammoniate electrolytes. Trudy NPI 134:31-43 '62. (MIRA 17:2)

YURINSKAYA, L.V., inzh.; POPOV, S.Ya., inzh.

Electroplating with copper-antimony alloy. Mashinostroenie  
no.3:64-65 My-Je '63. (MIRA 16:7)

1. Novocherkasskiy politekhnicheskiy institut.  
(Copper plating)

S/884/62/134/000/003/004  
B101/B186

AUTHORS: Popov, S. Ya., Rybyanets, K. A., Golosnitskaya, V. A.  
TITLE: Cathodic polarization on separating Zn, Cd, Ag, and Cu from complex ammoniacal electrolytes  
SOURCE: Novocherkassk. Politekhnikheskiy institut. Trudy. v. 134. 1962. Raboty kafedry tekhnologii elektrokhimicheskikh proizvodstv Khimiko-tekhnologicheskogo fakul'teta, 31 - 43

TEXT: To study the causes of increased polarization, the polarization at 20°C was recorded potentiometrically using a Heyrovsky polarograph for the electrolytes 0.14mole/l ZnO + 4.5 mole/lNH<sub>4</sub>Cl; 0.04 mole/l CdO + 0.06 mole/l CdCl<sub>2</sub> + 4.5 mole/l NH<sub>4</sub>Cl; 0.2 mole/l AgNO<sub>3</sub> + 0.4 mole/l NH<sub>3</sub> + 1.5 mole/l (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>, and 0.4 mole/l CuSO<sub>4</sub> + 0.4 mole/l (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> + 0.4 mole/l H<sub>2</sub>SO<sub>4</sub>. Results: (1) For the ammoniacal zinc electrolyte, the differential curve  $\varphi = f(i_{\text{cath}})$  showed two minima and one maximum, the differential polarogram  $i_{\text{cath}} = f_1(\varphi)$  two maxima and one minimum. The

Card 1/3

Cathodic polarization on ...

S/884/62/134/000/003/004  
B101/B186

equilibrium potential of the zinc electrode was  $-0.855$  v and that of the  $Zn^{2+}$  ions  $-0.861$  v. Conclusion: The ascent of the polarographic curve to the first maximum corresponds to the delayed discharge of  $Zn^{2+}$  ions. In the descending curve section after the first maximum, the rate of the process depends on the delay of diffusion of the  $Zn^{2+}$  ions. The minimum corresponds to the potential at which the discharge of complex zinc ions begins, the ascent to the second maximum corresponds to the delayed discharge of the complex ions, and the drop after the second maximum to the delayed diffusion of the complex ions. (2) The cadmium electrolyte showed the same behavior. The equilibrium potential of the Cd electrode was  $-0.537$  v and that of the electrolyte  $-0.516$  v. (3) For the Ag electrolyte, the curve  $\phi = f(i_{cath})$  showed only one maximum and the polarogram only one minimum. Only one type of ions is discharged. The equilibrium potential of the Ag electrode was  $+0.501$  v and that of the Ag ions  $+0.519$  v. Conclusion: Only  $Ag^+$  ions are discharged, since the potential of the cathode does not reach the equilibrium potential of the complex Ag ions. (4) For the Cu electrolyte, the differential polarogram showed an indistinct maximum at low  $\phi$ , and a second, larger maximum

Card 2/3

GRIGOR'YEV, V.P.; POPOV, S.Ya.

Protective properties of lime deposits. Zhur.prikl.khim. 35  
no.7:1621-1625 J1 '62. (MIRA 15:8)  
(Lime) (Corrosion and anticorrosives)

GRIGOR'YEV, V.P.; POPOV, S.Ya.

Contact deposition of copper on iron from a sulfate ammonium  
electrolyte. Zhur.prikl.khim. 35 no.6:1308-1314 Je '62.  
(MIRA 15:7)  
(Copper plating) (Electrolytes)

POPOV, S.Ya.

Study of the kinetics of cathodic deposition of metals by the  
method of analysis of differential polarograms. Zhur.prikl.khim.  
35 no.6:1285-1292 Je '62. (MIRA 15:7)

1. Novocherkasskiy politekhnicheskiy institut.  
(Electroplating) (Polarography)

S/194/62/000/004/062/105  
D295/D308

AUTHORS: Bondarenko, A. V. and Popov, S. Ya.

TITLE: Cathode polarization in the electrocrystallization of metals under the action of sonic and ultrasonic oscillations

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 4, 1962, abstract 4-5-39e (V sb. Primeneniye ultrazvukov. k issled. veshchestva. no. 14, M., 1961, 87-94) ✓

TEXT: Cathode polarization during electrical deposition of copper, silver and zinc under the action of sonic and ultrasonic oscillations is investigated. Ultrasonic frequencies of 1250 kc/s were radiated from a barium-titanate ceramic transducer; sonic oscillations were generated by an electromagnetic vibrator fed from a.c. mains of industrial frequency. The ultrasonic intensity was determined by a thermistor measuring instrument. The comparison of the intensity of sonic oscillations was carried out on the basis of the value of

Card 1/2

S/194/62/000/004/067/105  
D295/D308

24,1800

AUTHORS: Bondarenko, A. V. and Popov, S. Ya.

TITLE: Potential of an electrode without current by the action of ultrasonic and sonic oscillations

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 4, 1962, abstract 4-5-39ch (V sb. Primeneniye ul'traakust. k issled. veshchestva. no. 14, M., 1961, 95-99)

TEXT: The influence of sound of 100 c/s and ultrasound of 1950 kc/s on the non-equilibrium potential of an electrode without current is investigated. Sound oscillations were communicated to the electrode from an electromagnetic vibrator, the electrode being attached to the armature of the vibrator by means of a rod. 5 references. [Abstracter's note: Complete translation.]

Card 1/1

S/058/62/000/002/020/053.  
A058/A101

AUTHORS: Bondarenko, A. V., Popov, S. Ya.

TITLE: Cathode polarization incident to electrocrystallization of metals under the action of sonic and ultrasonic vibrations

PERIODICAL: Referativnyy zhurnal, Fizika, no. 2, 1962, 43, abstract 26330  
(V sb. "Primeneniye ul'traakust. k issled. veshchestva", no. 14, Moscow, 1961, 87-94)

TEXT: Incident to the electrocrystallization of metals ultrasonic and sonic vibrations decrease the magnitude of overvoltage in that region of current densities where there occurs concentration polarization. The lower the concentration of rarefying ions, the greater the reduction of polarization. The rate and magnitude of cathode passivation is appreciably greater in the presence of a field of acoustic vibrations than in the absence of such a field. Galvanic platings produced under the action of ultrasonic or sonic vibrations may have either a finer or a coarser crystal structure than in the case of electrocrystallization without vibrations. The throwing power of the electrolyte in the presence of vibrations may be either better or worse than in their absence. A satisfactory

Card 1/2

S/058/62/000/002/018/053  
A058/A101

AUTHORS: Bondarenko, A. V., Ponov, S. Ya.

TITLE: Currentless electrode potential under the action of ultrasonic and sonic vibrations

PERIODICAL: Referativnyy zhurnal. Fizika, no. 2, 1962, 42, abstract 20313 (V sb. "Primeneniye ul'traakust. k issled. veshchestva", no. 14, Moscow, 1961, 95-99)

TEXT: It was found that ultrasonic and sonic vibrations exert an effect on currentless nonequilibrium electrode potential. In the electronegative metals Zn and Pb, the potential under the action of vibrations is shifted to the side of positive values while in the electropositive metal copper, the potential is shifted to the side of negative values. This shift in potential can be explained from the standpoint of the depolarizing action of ultrasonic and sonic waves on the cathode and anode polarization of micropairs. In designing the thickness of galvanic platings for components operating under conditions of vibration, it is necessary to take into account the possibility of increase of corrosion current under the action of vibrations.

[Abstracter's note: Complete translation]  
Card 1/1